

# Trichinosis

(Also known as Trichinellosis)

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## 1) THE DISEASE AND ITS EPIDEMIOLOGY

### A. Etiologic Agent

Trichinosis is caused by *Trichinella spiralis*, a parasitic intestinal roundworm. There are multiple species of *Trichinella* capable of causing infection in mammals, but *T. spiralis* is the most common cause of human infection.

### B. Clinical Description

Trichinosis in humans can range from asymptomatic to fatal, depending on the infective dose. Most infections in the United States are asymptomatic. In the week following ingestion of infected meat, a patient may experience nausea, vomiting, diarrhea and abdominal discomfort as the larvae attach to the intestinal mucosa. A sudden onset of muscle soreness and pain, fever, edema of the upper eyelid and urticarial rash, 2 to 8 weeks after ingestion, is characteristic of infection as larvae migrate into muscle tissue. Eye pain, photophobia, thirst, profuse sweating, chills, weakness and a rapid increase in eosinophil levels on blood exam may also occur. Recurring high fever (as high as 104°F) usually stops after 1 to 6 weeks. In the most severe infections, cardiac and neurologic complications, sometimes leading to death, may occur in the 3<sup>rd</sup> to 6<sup>th</sup> week.

### C. Reservoirs

Swine, dogs, cats, horses, rats and many wild animals, such as bear, wolf, wild boar, fox and Arctic marine mammals, can serve as reservoirs for *Trichinella*.

### D. Modes of Transmission

Transmission occurs by ingestion of raw or undercooked meats containing *Trichinella* cysts. Pork and pork products are the most likely source. Beef products, which may become inadvertently adulterated with raw pork during processing, may also be a source. As many as 30% of domestic cases of trichinosis are thought to be related to the ingestion of meat from wild game animals. There is no person-to-person spread of trichinosis.

### E. Incubation Period

Gastrointestinal symptoms may appear within a few days of infection; appearance of systemic symptoms ranges from 5 to 45 days. The usual incubation period is 8 to 15 days. If large numbers of cysts are ingested, symptoms may occur more rapidly.

### F. Period of Communicability or Infectious Period

Trichinosis is not transmitted directly from person-to-person. Animal hosts may remain infective for months, and meat from these animals remains infective until the larvae are killed by sufficient cooking, freezing or irradiation.

### G. Epidemiology

Trichinosis occurs worldwide and affects people of all ages. Depending on local customs regarding eating pork or undercooked meats, the incidence of disease is variable.

## 2) REPORTING CRITERIA AND LABORATORY TESTING SERVICES

### A. What to Report to the Massachusetts Department of Public Health

- Demonstration of *Trichinella* larvae in tissue obtained by muscle biopsy, or
- Positive serologic test for *Trichinella*.

*Note:* See Section 3) C below for information on how to report a case.

### B. Laboratory Testing Services Available

The Massachusetts State Laboratory Institute (SLI) does not provide services for parasite identification in clinical specimens or implicated food samples. The SLI Reference Laboratory will process sera for serologic testing at the Centers for Disease Control and Prevention (CDC). For more information, contact the Reference Laboratory at (617) 983-6607 for procedures necessary to submit specimens.

## 3) DISEASE REPORTING AND CASE INVESTIGATION

### A. Purpose of Surveillance and Reporting

- To identify sources of public health concern (*e.g.*, undercooked *Trichinella*-infected pork being sold at a restaurant) and to stop transmission from such a source.
- To identify and control outbreaks.

### B. Laboratory and Healthcare Provider Reporting Requirements

Refer to the lists of reportable diseases (at the end of this manual's Introduction) for information.

### C. Local Board of Health Reporting and Follow-Up Responsibilities

#### 1. Reporting Requirements

Massachusetts Department of Public Health (MDPH) regulations (*105 CMR 300.000*) stipulate that each local board of health (LBOH) must report the occurrence of any case of trichinosis, as defined by the reporting criteria in Section 2) A above. Current requirements are that cases be reported to the MDPH Division of Epidemiology and Immunization, Surveillance Program using an official CDC *Trichinosis Surveillance Case Report* form (in Appendix A). Refer to the *Local Board of Health Reporting Timeline* (at the end of this manual's introductory section) for information on prioritization and timeliness requirements for reporting and case investigation.

#### 2. Case Investigation

- a. It is the LBOH responsibility to complete CDC *Trichinosis Surveillance Case Report* form (in Appendix A) by interviewing the case and others who may be able to provide pertinent information. Much of the information required on the case report form can be obtained from the case's healthcare provider or the medical record.
- b. Use the following guidelines to assist you in completing the form:
  - 1) Accurately record the demographic information, occupation, whether hospitalized (including dates), date of symptom onset, symptoms and other medical information, healthcare provider information, and outcome of disease (*e.g.*, recovered, died). Please include a full name and address for the case.
  - 2) Complete the sections on exposures. When asking about exposure history use the incubation period range for *Trichinella* (5–45 days). Specifically, focus on the period beginning a minimum of 5 days prior to the case's onset date back to no more than 45 days before onset for the following exposures:
    - a) Food(s) derived from pork.
    - b) Non-pork food(s), including beef, wild game, dried jerkys, and other food(s).

- 3) Use the MDPH *Foodborne Illness Complaint Worksheet* (in Appendix A) to facilitate recording additional information. It is requested that LBOHs fax or send this worksheet to the MDPH Division of Food and Drugs (see top of worksheet for fax number and address). This information is entered into a database to help link other complaints from neighboring towns, thus helping to identify foodborne illness outbreaks. *This worksheet does not replace the CDC Trichinosis Surveillance Case Report form.*
  - 4) If you have made several attempts to obtain case information, but have been unsuccessful (*e.g.*, the case or healthcare provider does not return your calls or respond to a letter, or the case refuses to divulge information or is too ill to be interviewed), please fill out the case report form with as much information as you have gathered. Please note on the form the reason why it could not be filled out completely.
- c. After completing the case report form, attach lab report(s) and mail (in an envelope marked “Confidential”) to the MDPH Division of Epidemiology and Immunization, Surveillance Program. The mailing address is:  
MDPH, Division of Epidemiology and Immunization  
Surveillance Program, Room 241  
305 South Street  
Jamaica Plain, MA 02130
  - d. Institution of disease control measures is an integral part of case investigation. It is the LBOH responsibility to understand, and, if necessary, institute the control guidelines listed below in Section 4), Controlling Further Spread.

## 4) CONTROLLING FURTHER SPREAD

### A. Isolation and Quarantine Requirements (105 CMR 300.200)

None.

### B. Protection of Contacts of a Case

None.

### C. Managing Special Situations

#### **Reported Incidence Is Higher than Usual/Outbreak Suspected**

If you suspect an outbreak, investigate to determine the source of infection and mode of transmission. A common vehicle, such as food, should be sought and applicable preventive or control measures should be instituted (*e.g.*, removing an implicated food item from the environment). Consult with the epidemiologist on-call at the Division of Epidemiology and Immunization at (617) 983-6800 or (888) 658-2850. The Division can help determine a course of action to prevent further cases and can perform surveillance for cases across town lines and therefore be difficult to identify at a local level.

*Note:* Refer to the MDPH’s *Foodborne Illness Investigation and Control Reference Manual* for comprehensive information on investigating foodborne illness complaints and outbreaks. (Copies of this manual were distributed to local boards of health in 1997–98. It can also be located on the MDPH website in PDF format at <<http://www.magnet.state.ma.us/dph/fpp/refman.htm>>.) For recent changes (fall of 2000) to the Massachusetts Food Code, contact the Division of Food and Drugs, Food Protection Program at (617) 983-6712 or through the MDPH website at <<http://www.state.ma.us/dph/fpp/>>.

## D. Preventive Measures

### Personal Preventive Measures/Education

To avoid future exposures, individuals should be made aware of the following:

- Thoroughly cook pork, pork products and wild game until the meat is no longer pink. This can be achieved by allowing sufficient cooking time so that all parts of the meat reach an internal temperature of at least 160°F (71°C). Freezing pork less than 6 inches thick for 20 days at 5°F will kill the larvae, but freezing wild game meats may leave some larvae alive.
- Grind pork in a separate grinder and thoroughly disinfect the grinder between different products.
- Hunters should thoroughly cook all meats from wild animals. Meat products should be processed by heating, freezing or irradiation prior to drying or smoking for jerky.
- Cook any meat fed to pigs or other animals.
- Hogs should not be allowed to eat uncooked carcasses of other animals, including rats, which may be infected with trichinosis.
- Be aware that curing (salting), drying, smoking, or microwaving meat does not consistently kill infective larvae.
- Individuals known to have recently ingested the same product as the case being investigated should consult with their healthcare provider regarding treatment options.

## ADDITIONAL INFORMATION

The formal CDC surveillance case definition for trichinosis is the same as the criteria outlined in Section 2A of this chapter. (CDC case definitions are used by state health departments and CDC to maintain uniform standards for national reporting.) Always refer to Section 2) A of this chapter for the criteria in reporting a case to the MDPH.

## REFERENCES

American Academy of Pediatrics. *1997 Red Book: Report of the Committee on Infectious Diseases*. Illinois, Academy of Pediatrics, 1997.

CDC. Case Definitions for Infectious Conditions Under Public Health Surveillance. *MMWR*. May 2, 1997; 46:RR-10.

CDC Website. Trichinosis Fact Sheet. Available at <[http://www.cdc.gov/ncidod/dpd/parasites/trichinosis/factsht\\_trichinosis.htm](http://www.cdc.gov/ncidod/dpd/parasites/trichinosis/factsht_trichinosis.htm)>. Updated August 15, 1999.

Chin, J., ed., *Control of Communicable Diseases Manual, 17<sup>th</sup> Edition*. Washington, DC, American Public Health Association, 2000.

MDPH. *Regulation 105 CMR 300.000: Reportable Diseases and Isolation and Quarantine Requirements*. MDPH, Promulgated November 1998, (Printed July 1999).

McAuley, J.B., Michelson, M.K., Schantz, P.M., Trichinosis Surveillance, United States, 1987–1990. *MMWR*. 1990; 40(SS-3): 35-42.